

THE IDENTITY OF SIR JOSEPH BANKS' "WRATHFULL MILITIA": THE LARVAE OF *DORATIFERA STENORA* TURNER (LEPIDOPTERA: LIMACODIDAE)

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Abstract

A description of an encounter with stinging caterpillars on 23 May 1770 at Bustard Bay, Queensland in Joseph Banks' Endeavour journal refers to larvae of *Doratifera stenora* Turner and is the first record of Limacodidae from Australia. Mature larvae of *D. stenora* matching Banks' description were collected in April 1999 at Ningi, southeastern Queensland, feeding on leaves of Spotted mangrove, *Rhizophora stylosa* Griffith (Rhizophoraceae). Notes on the life history, larval morphology and distribution of *D. stenora* are provided. Larvae of *D. stenora* differ markedly from those of other species of *Doratifera* Duncan [& Westwood]. It is the only known species with gregarious mature larvae and the only species known to feed on Rhizophoraceae. Mature larvae have a full complement of 10 pairs of lateral and 10 pairs of subdorsal scoli, all apparently armed with stinging setae. They lack the pairs of subdorsal protuberances armed with eversible rosettes of stinging setae that are characteristic of other known *Doratifera* larvae.

Introduction

The first species of cupmoth (Limacodidae) to be described from Australia was *Comana coronae* (Fabricius), an adult of which was collected on Cook's first voyage in 1770 at the present site of Cooktown (Edwards 1996). Slightly earlier in the voyage Sir Joseph Banks made reference in his journal to caterpillars that have been thought to belong to a species of limacodid by virtue of their stinging ability (Musgrave 1954, Waterhouse 1971).

On 23 May 1770, the Endeavour was anchored in Bustard Bay near the site of the present day town of Seventeen Seventy, Queensland. Banks' journal entry for that date included the passage below that follows another describing an encounter with Green tree ants, *Oecophylla smaragdina* (Fabricius) (Musgrave 1954).

'The Mangroves had also another trap which most of us fell into, a small kind of Caterpiler, green and beset with many hairs: these sat upon the leaves many together rangd by the side of each other like soldiers drawn up, 20 or 30 perhaps upon one leaf; if these wrathfull militia were touchd but ever so gently they did not fail to make the person offending them sensible of their anger, every hair in them stinging much as nettles do but with a more acute tho less lasting smart.' (Banks 1962: 66).

Beaglehole, the editor of the 1962 edition of Banks' journal, noted that the caterpillars were almost certainly those of a limacodid belonging to the genus *Doratifera* Duncan [& Westwood]. Burwell (2000) reported the discovery of the same larvae feeding on Spotted mangrove, *Rhizophora stylosa* Griffith (Rhizophoraceae), near Bribie Island in southeastern Queensland. Adults

were reared from these larvae and provisionally identified as a species of *Doratifera* (Burwell 2000). Subsequently they were identified as *Doratifera stenora* Turner by EDE. Notes on the distribution and life history of the species are provided below.

Observations

Mature larvae of *D. stenora* were collected by Peter Davie and Bronwyn Searle on 12 April 1999 at Ningi (27°02'S 153°06'E), just north of Brisbane, in mangroves lining Pumistone Passage opposite the southern end of Bribie Island. The larvae closely matched Banks' description and were clustered together, side-by-side, in groups of between 9 and 21, on the undersides of leaves of Spotted mangrove, *R. stylosa* (Fig. 1). All larvae of each row had their heads directed towards the leaf margins. They were tightly packed with much of the lateral edges of adjacent larvae in close contact (Fig. 2). The larvae were reared in captivity on *R. stylosa* foliage and pupated within stiff, brown, rounded cocoons, approximately 9 mm long and 6 mm wide, that were spun between leaves. Adult specimens have been deposited in the Queensland Museum, Brisbane (QM) and the Australian National Insect Collection, Canberra (ANIC).

Larval morphology

Unfortunately, the significance of the larvae was not realised at the time and notes on their morphology were not made, nor were larvae preserved. Consequently, the following larval description is based primarily on Figs 1 and 2.

Mature larva. Length, including scoli, approximately 18 mm. Mottled green dorsally with thin, darker green central line along most of length; pair of broader dark green stripes either side of central line but mesad of bases of subdorsal scoli, each stripe enclosing a series of pale spots, one per segment; thoracic tergum 1 mostly white, with central plate bearing two black, comma-shaped markings; posterior end of larva with pair of black spots. Paired, relatively short, conical, lateral scoli present on thoracic segments 2 and 3 and abdominal segments 2-9; lateral scoli of similar length except those on abdominal segment 9 conspicuously longer; paired subdorsal scoli present on thoracic segments 2 and 3 and abdominal segments 1-8; subdorsal scoli mostly directed dorsally, relative lengths unable to be determined from Figs 1 and 2; subdorsal scoli on thoracic segment 2 projecting anteriorly to some extent, conspicuously longer than lateral scoli of same segment; all scoli appear armed with strong setae, more densely on subdorsal scoli.

Distribution and host plant

Doratifera stenora occurs in the southern half of Queensland and far northern New South Wales, east of the Great Dividing Range. In addition to Bustard Bay and Ningi, specimens of *D. stenora* in the QM and ANIC have been collected from Shute Harbour, Yeppoon, Rockhampton (syntype male and

female), Curtis Island, Gladstone, Cooroy, Borumba Dam, Bunya Mountains and Mount Tamborine in Queensland and Sheepstation Creek, Border Ranges National Park in northern New South Wales. Adults from Gladstone were reared from cocoons on *Rhizophora stylosa* by N. Duke while those from Curtis Island were reared from larvae also on *R. stylosa* by W. Houston. Hockey and DeBaar (1991) recorded adults of *Doratifera unicolor* Swinhoe reared from cocoons collected on the stem of *R. stylosa* at Mary River Heads near Maryborough, Queensland. This record almost certainly refers to *D. stenora* which was incorrectly synonymised with *D. unicolor* by Turner (1926).

Interestingly, adults of *D. stenora* have been collected at several localities that are considerable distances from the coast and the nearest *Rhizophora* plants. In particular, specimens have been taken in montane rainforest at Mount Tamborine and the Border Ranges around 25 km from the coast, while those from the Bunya Mountains were collected in the order of 150 km from the coast. Presumably the larvae develop on an alternative host plant in these localities. It is also possible that specimens from these non-coastal, rainforest localities may represent a different species although their genitalia are identical to those of coastal specimens associated with mangroves. However, adults of *Doratifera quadriguttata* (Walker) and *D. casta* (Scott) have very similar adults and genitalia, yet have dramatically different larvae. Consequently the status of the non-coastal populations of *D. stenora* can not be resolved until their foodplants and larvae are discovered.

Discussion

The genus *Doratifera* has a wide distribution in mainland Australia and Tasmania (Common 1990) and includes 8 described species (Edwards 1996). The life history and larvae of *D. stenora* differ significantly from those of other species, of which the life history is known, in the genus.

Firstly, *D. stenora* is the only species utilising a foodplant within the Rhizophoraceae. Other known *Doratifera* larvae feed mostly on plants within the Myrtaceae, particularly species of *Eucalyptus* but also species of *Lophostemon*, *Angophora*, *Melaleuca* and Guava, *Psidium guajava* (Common 1990). *Doratifera vulnerans* (Lewin) has also been recorded feeding on Apricot, *Prunus armeniaca* (Rosaceae) (Common 1990). Secondly, the gregarious habit of the mature larvae of *D. stenora* is unusual for the genus. Mature larvae of other species of *Doratifera* are generally 'solitary' feeders although the early instars of some, for example *D. casta*, may feed gregariously (CJB pers. obs.). However, Turner (1902) noted that the larvae of *Lamprolepida chrysochroa* (R. Felder) fed gregariously on *Planchonia careya* (Barringtoniaceae) at Townsville, Queensland. *Doratifera* and *Lamprolepida* Turner may be closely related genera as both have veins Sc+R1 and Rs fused for at least half the length of the discal cell in the hindwing (Turner 1926).



Figs 1-3. Mature larvae of *Doratifera* spp. (1) *D. stenora* in situ on the undersides of leaves of Spotted Mangrove, *Rhizophora stylosa*. (2) Dorsal view of *D. stenora*. Note the full complement of 10 pairs of lateral scoli. All but the most anterior pairs of subdorsal scoli (top) are obscured against the greenish coloration of the larvae. (3) Dorsal view of *D. vulnerans*. Note the 2 pairs of anterior (left) and 2 pairs of posterior subdorsal protuberances bearing eversible rosettes of stinging hairs.

Most significantly, the larval morphology of *D. stenora* differs markedly from that of other species of *Doratifera*. Mature *D. stenora* larvae have a full complement of 10 pairs of lateral and 10 pairs of subdorsal scoli that are well-developed and all of which bear strong, presumably stinging setae. In contrast, other known *Doratifera* larvae have at least some of the subdorsal scoli on the abdominal segments conspicuously reduced in size or absent.

In addition, they have stinging setae confined to two pairs of anterior and sometimes two additional pairs of posterior subdorsal protuberances (Fig. 3). These protuberances appear to be modified scoli that bear expandable rosettes of stinging setae (Fig. 3). All the subdorsal scoli of *D. stenora* larvae are unmodified.

Given that *D. stenora* larvae are vastly different from those of other members of the genus, including the type species *D. vulnerans*, the taxonomic position of *D. stenora* may warrant examination in any future detailed work on *Doratifera*.

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